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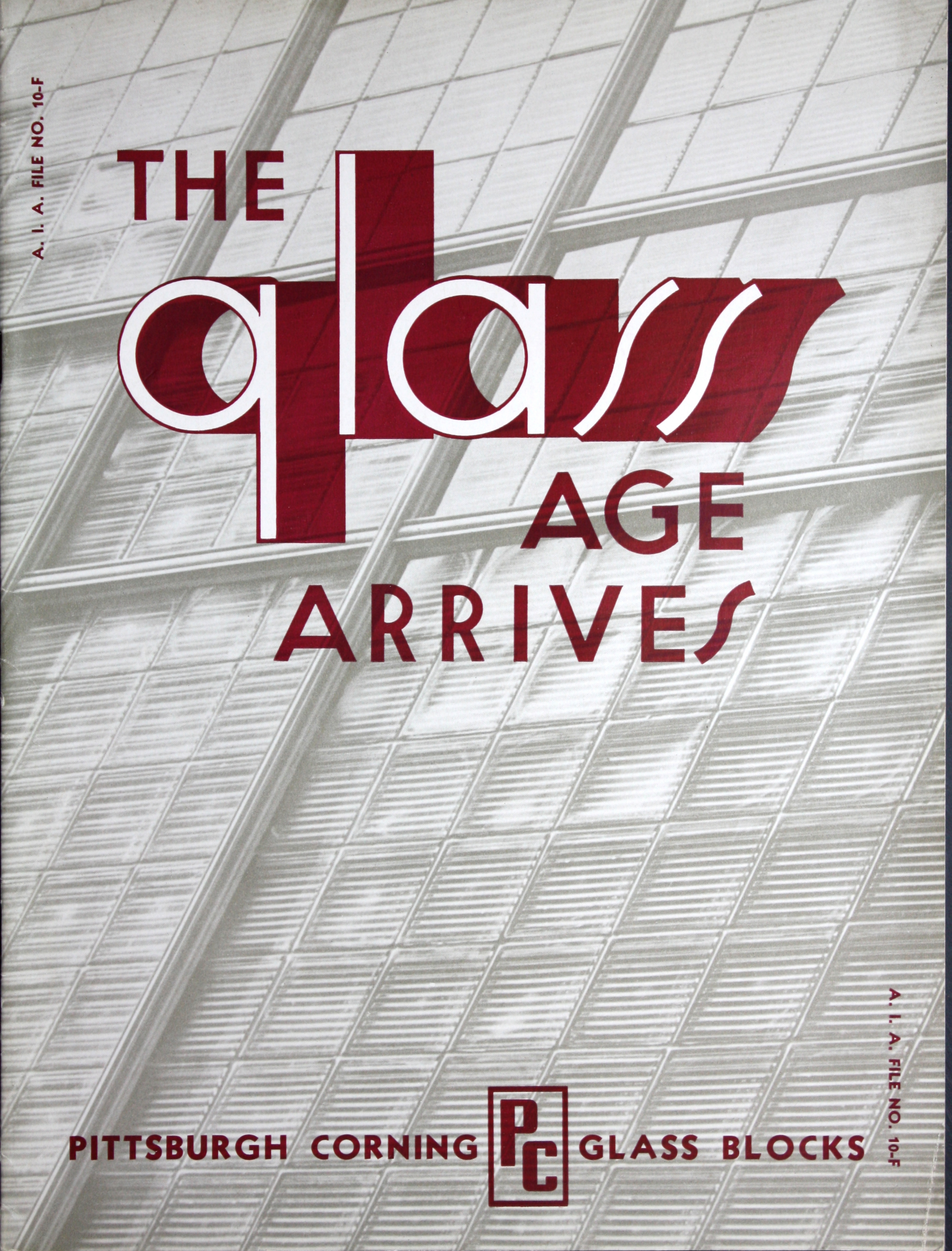
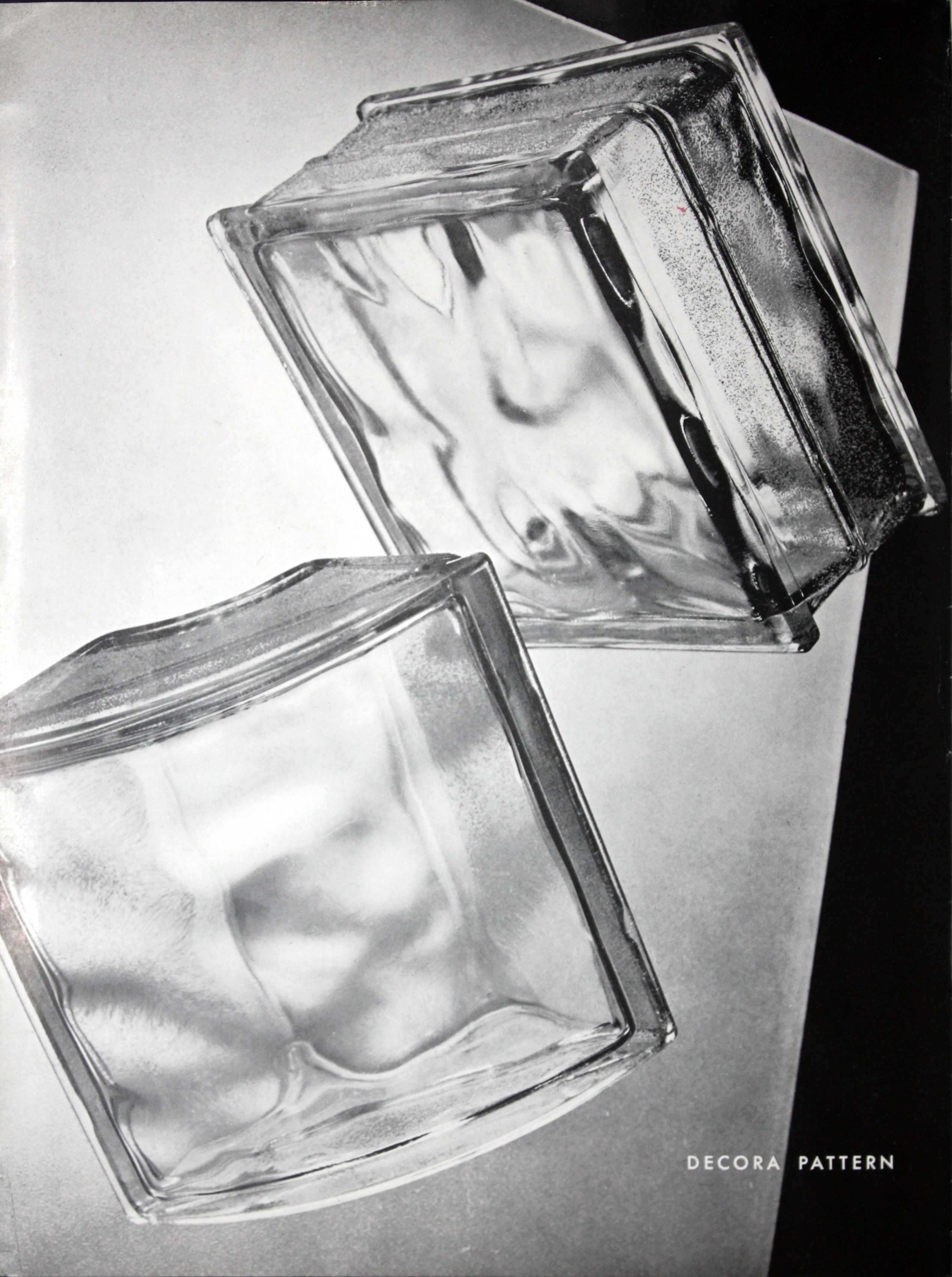


THE glass AGE ARRIVES

A. I. A. FILE NO. 10-F

PITTSBURGH CORNING PC GLASS BLOCKS



DECORA PATTERN

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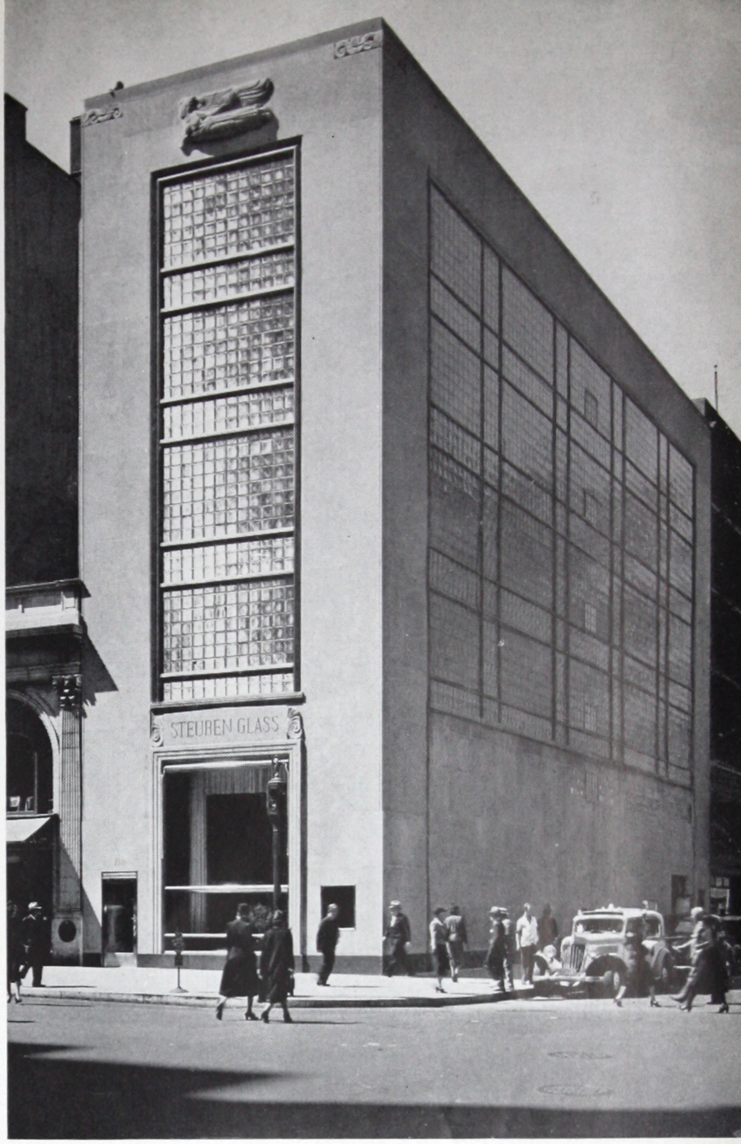

STEUBEN BUILDING, WILLIAM AND GEOFFREY PLATT, ARCHITECTS
JOHN M. GATES ASSOCIATE

Gottscho

AMERICA

while the world's largest manufacturer and user of glass block, is by no means alone in its acceptance of this new and radically different building material. Within a phenomenally short time it has become one of the few truly international elements of modern architecture, recognized as the final development in the search for a material that would be at once enclosing wall and window, admitting light, and impervious to heat and cold.

The illustrations on the following pages include a number of outstanding examples of glass block use in America, and some representative foreign buildings executed in block of European manufacture. Better than any description these pictures show the infinite variety of treatment possible with these units—their limitless adaptability to the most diverse conditions of climate, structural practice and local tradition.

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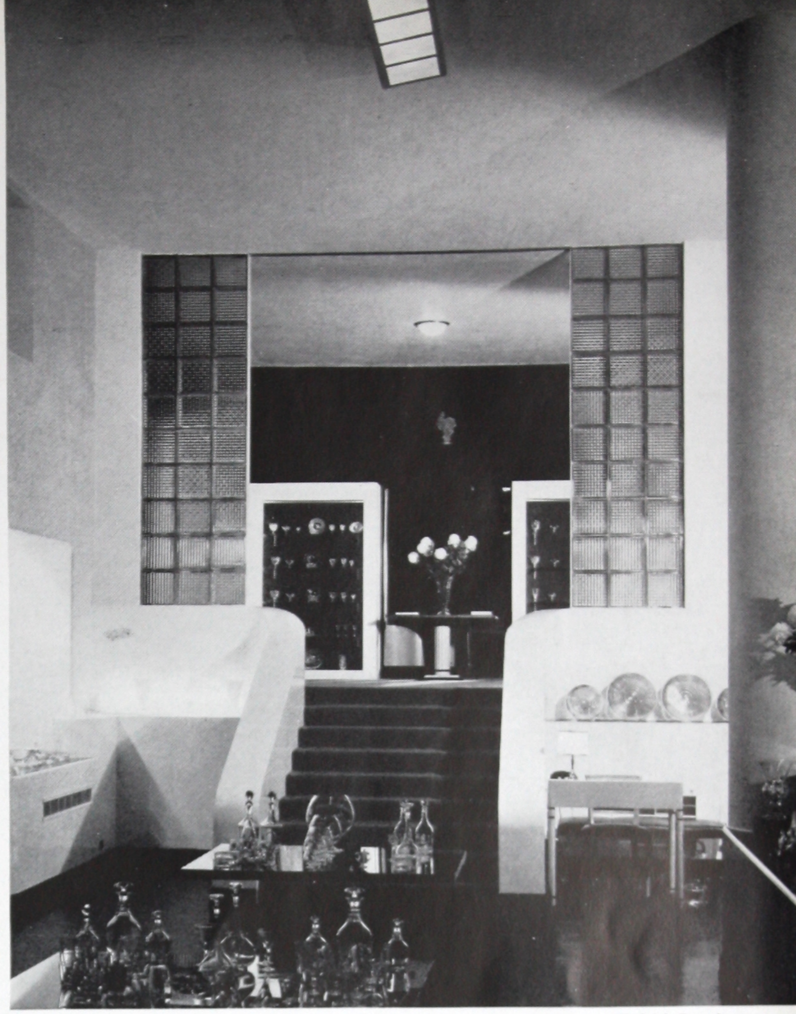
HEDRICH-BLESSING STUDIO, ABEL FAIDY, DESIGNER.

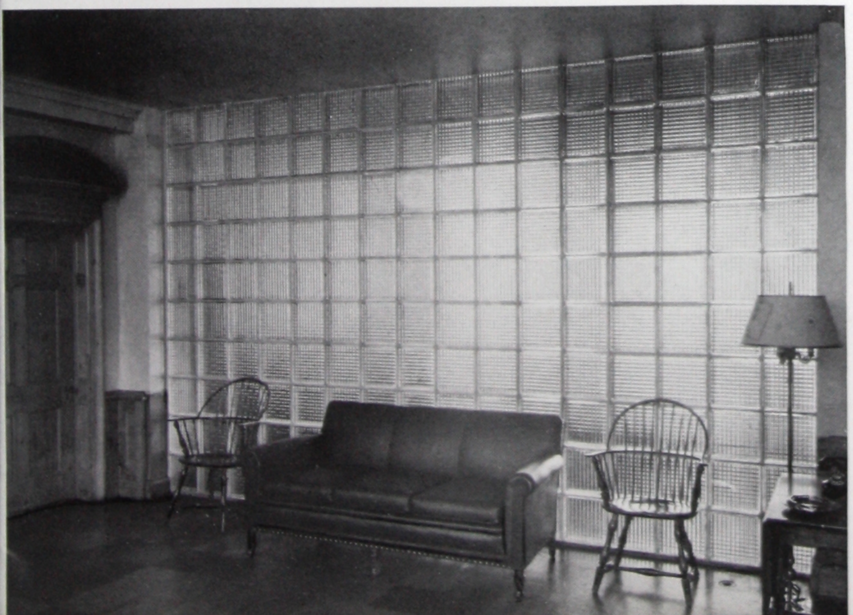


Hedrich-Blessing

STEUBEN GLASS SHOP   JOHN M. GATES ARCHITECT PUCKEY & JENKINS, ASSOCIATES

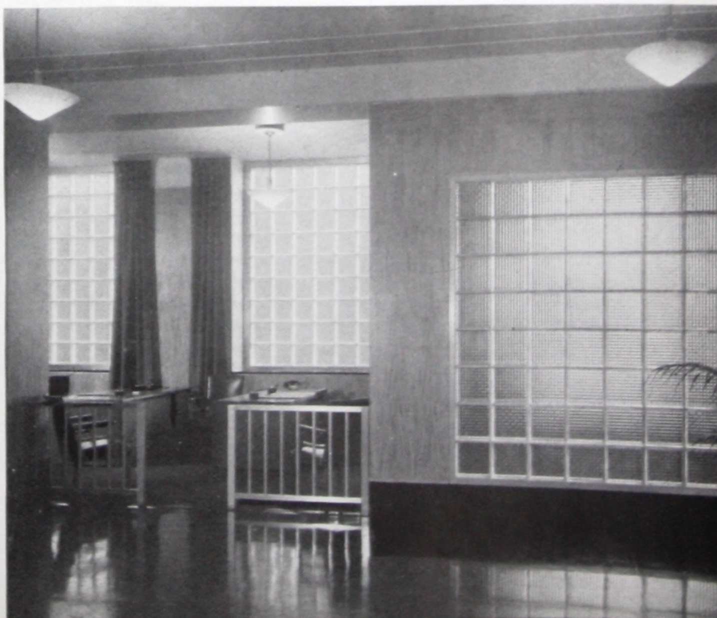
Possessing a unique combination of simplicity of form and textural richness, glass block greatly increases the design possibilities of commercial interiors. Whether used as a screen subdividing office space, as on the facing page, or as a purely decorative element, illustrated by the shop above, it is equally effective. Below it becomes a light-transmitting partition, perfectly in harmony with the traditional background and furniture. In the banking room on the right its insulating properties are demonstrated by its use in place of windows.

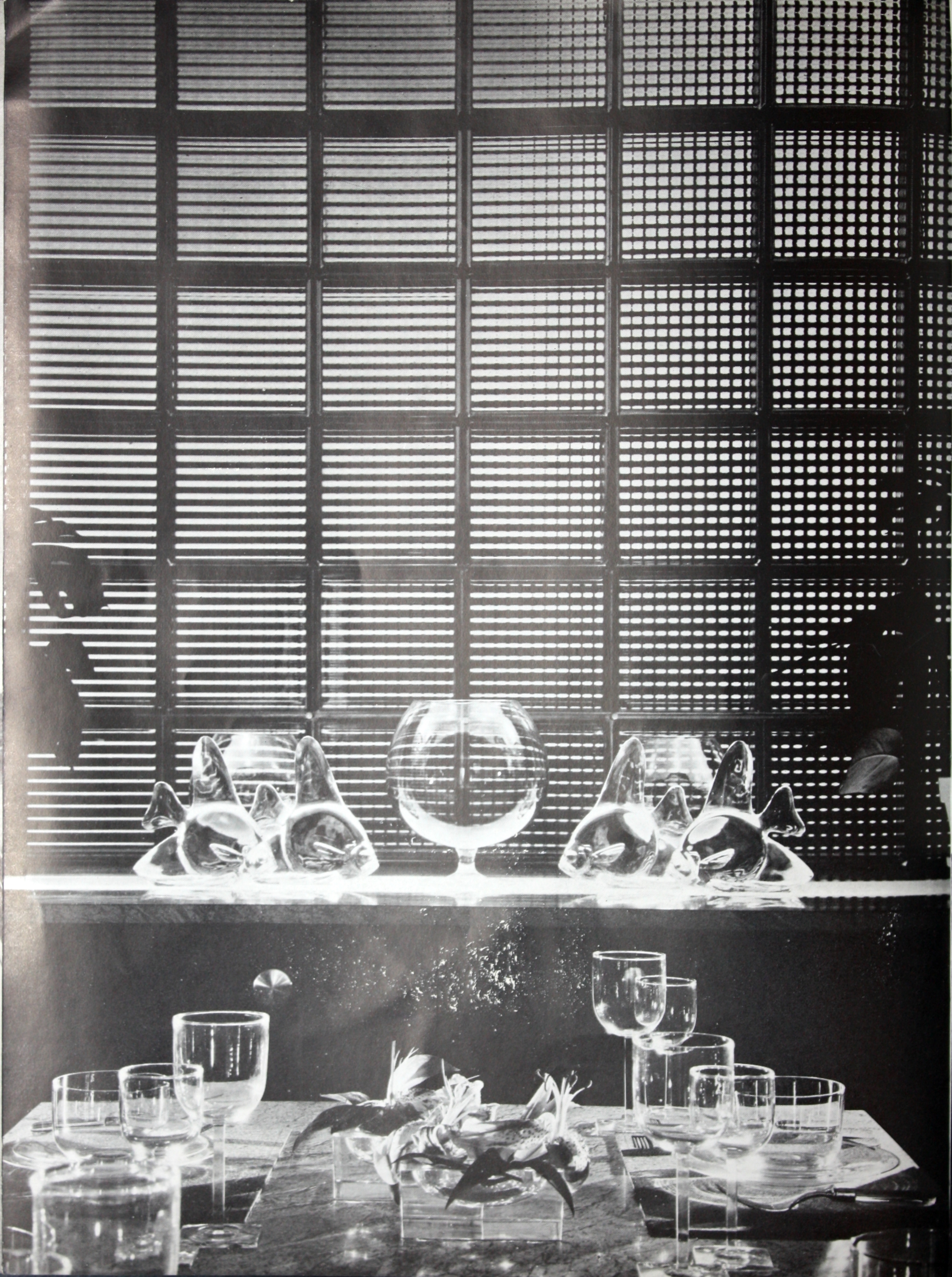
AMERICAN MOLASSES COMPANY OFFICE   THEODORE MEYER, ARCHITECT

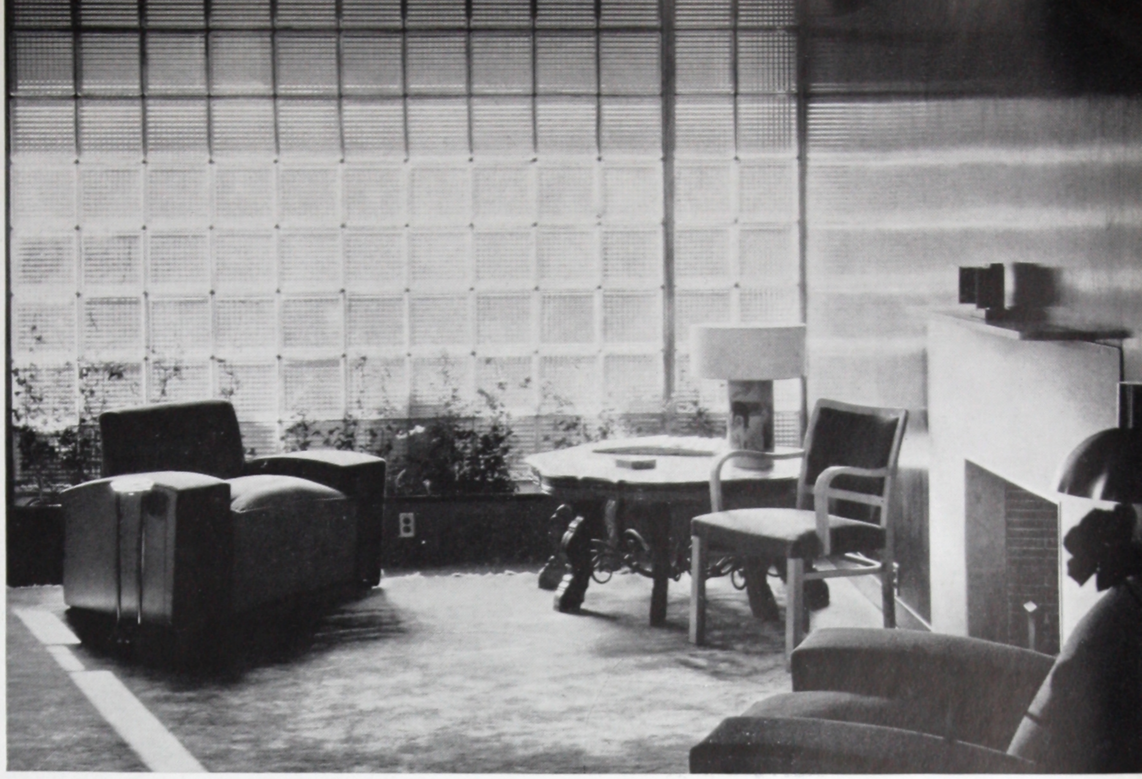


SPRINGFIELD FIVE-CENT SAVINGS BANK   THOMAS M. JAMES CO., ARCHITECTS

Richard Garrison



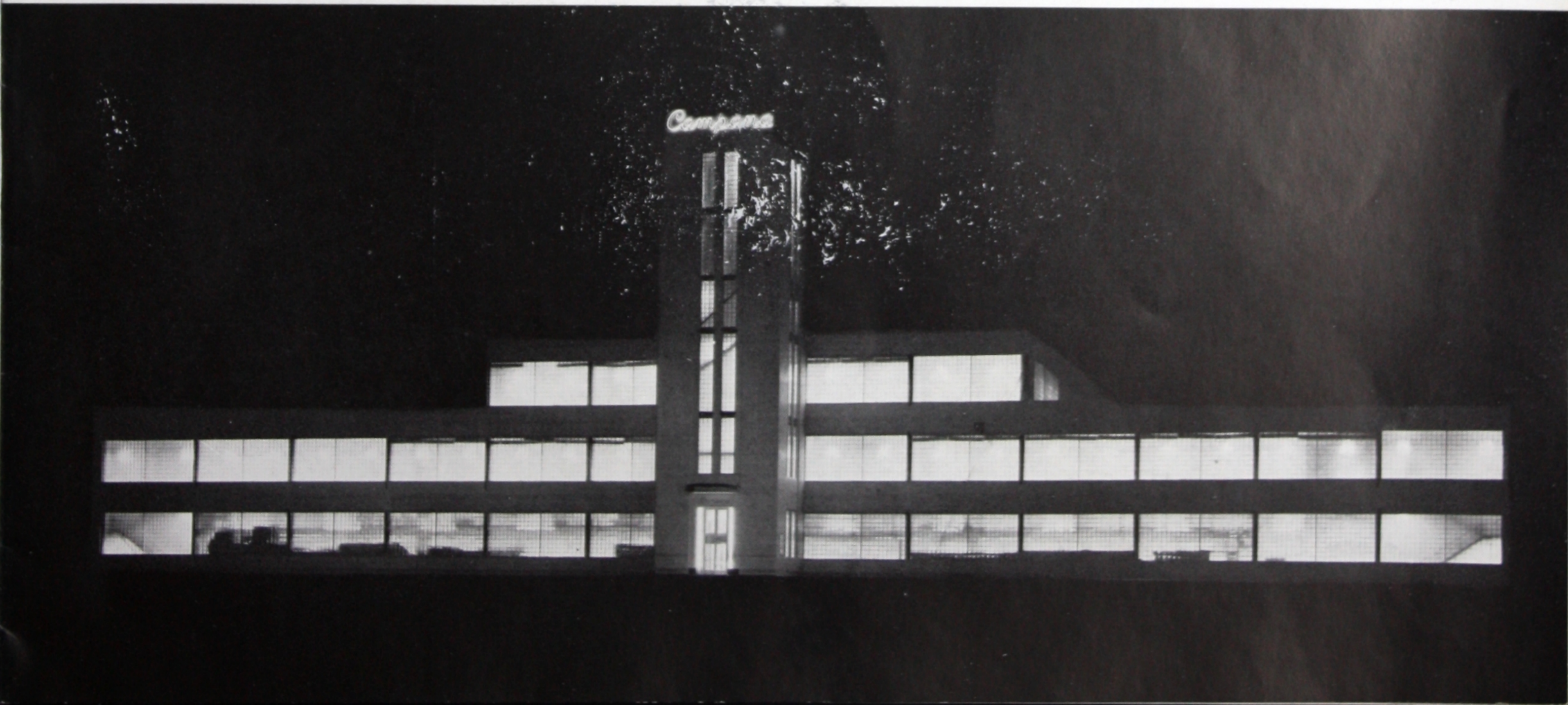


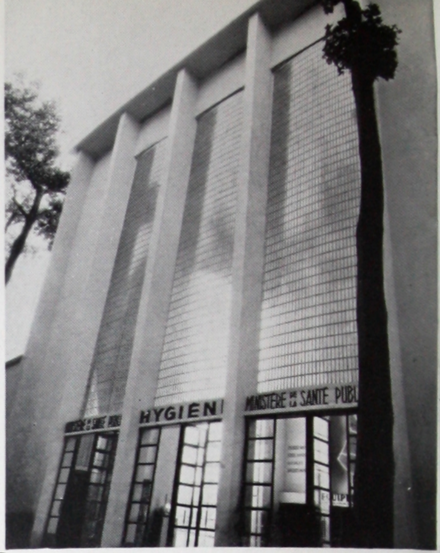


CITY RESIDENCE OF MORRIS B. SANDERS, ARCHITECT. DETAIL ON FACING PAGE. *Garrison*

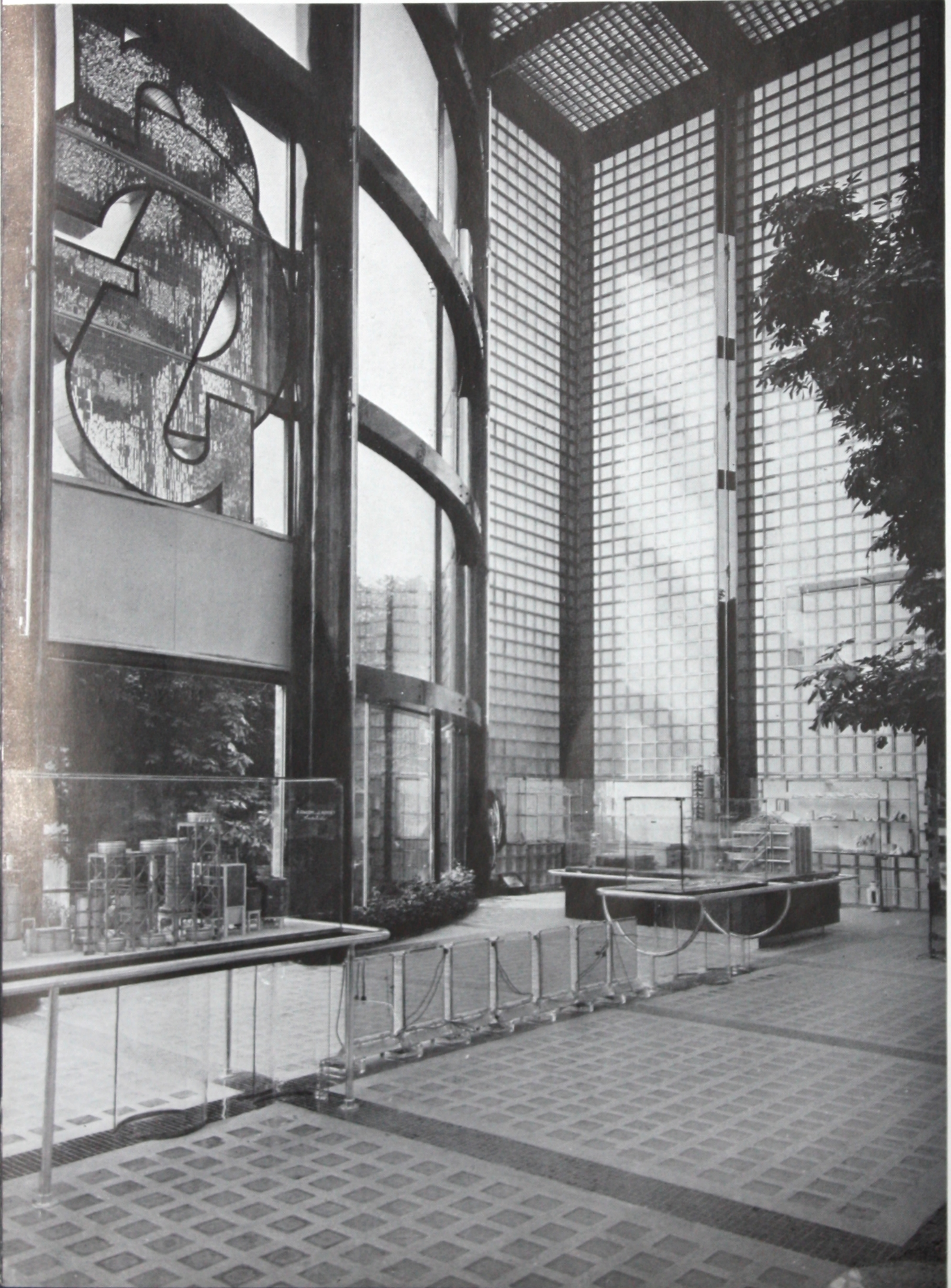
The problem of the modern city house is the exclusion of noise, dirt, and air vitiated by gasoline fumes; in the factory it is the balancing of heat loss against the huge glass areas needed for maximum light; in both cases glass block has provided the solution: sound and heat insulation, at the same time translucent. What other material is so flexible in its applications that it is equally suitable for factory enclosing walls and highly decorative backgrounds such as the one on the opposite page?

Hedrich-Blessing CAMPANA FACTORY FRANK D. CHASE AND CHILDS AND SMITH ASSOCIATED ARCHITECTS AND ENGINEERS.



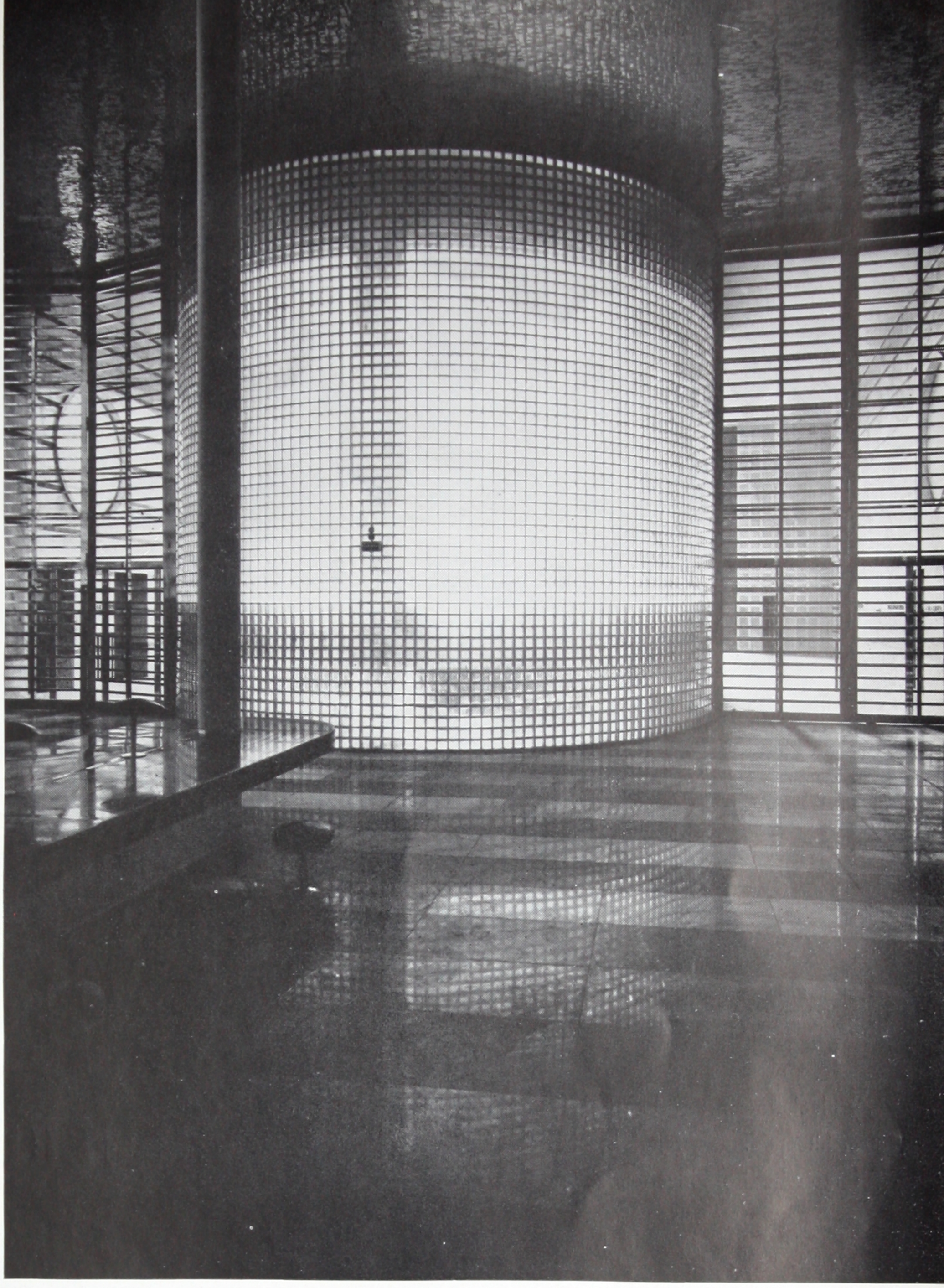


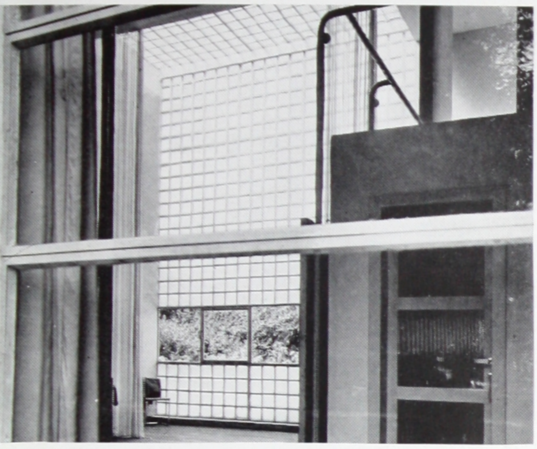
FRANCE

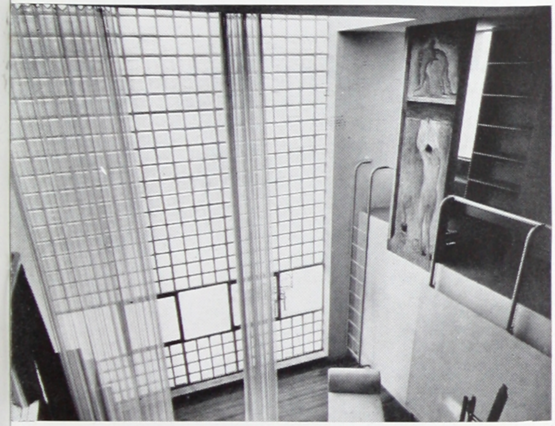


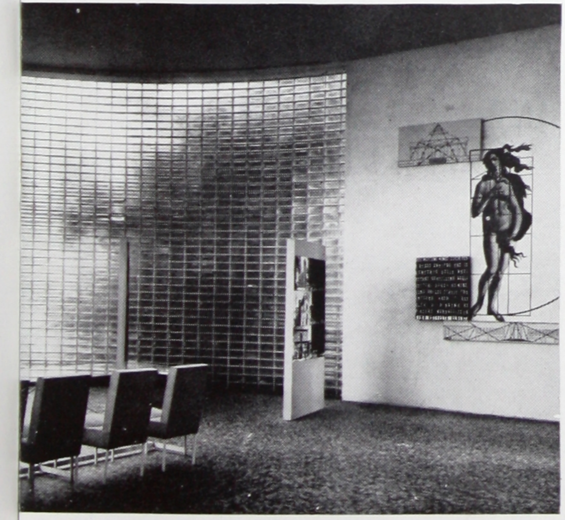
Most successful of the private buildings at the Paris Exposition was the St. Gobain pavilion, a virtually all-glass structure in which glass block was given the important function of serving as enclosing walls. The small illustration shows the Hygiene pavilion at the Exposition, a building in light blue cement and glass block.

ITALY



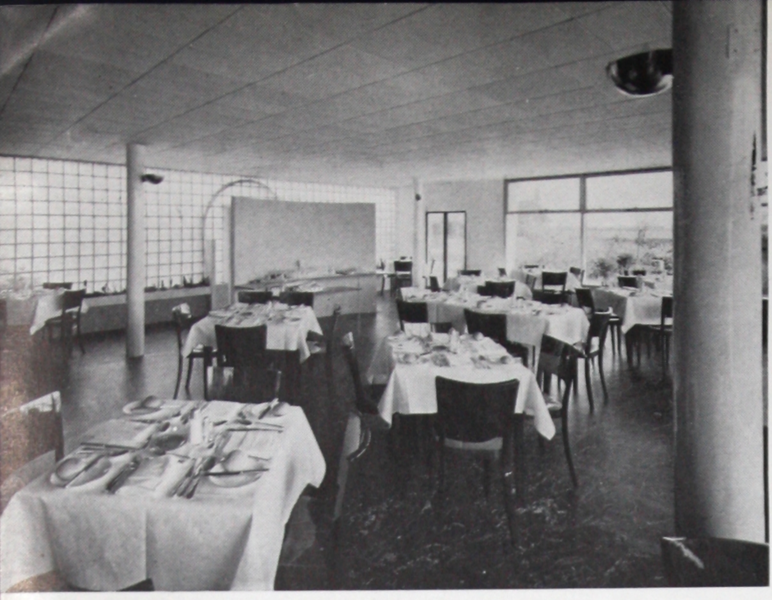


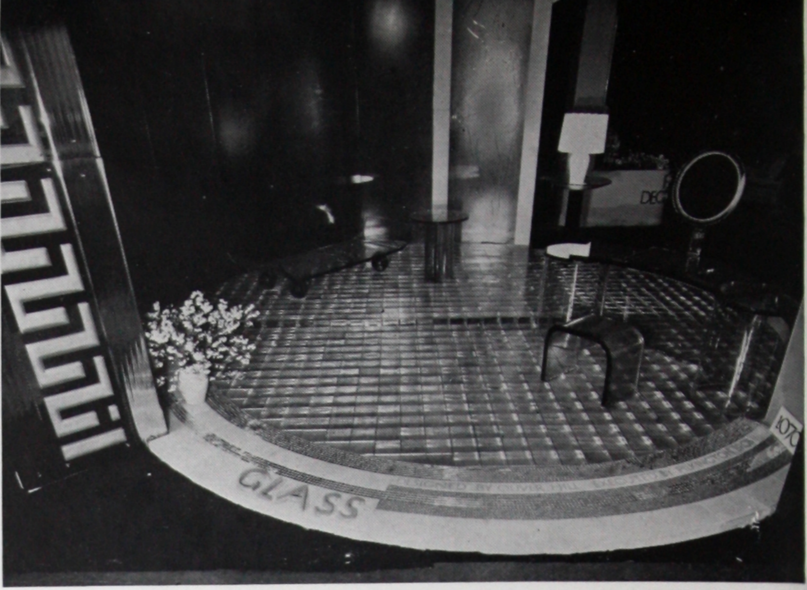




Italian participation in the modern movement has produced a number of striking buildings in which glass block is an integral feature. Above is an interior of the new Post Office in Naples. At the left are two views of a house designed for a painter; below, an interior in Milan.

PITTSBURGH CORNING PC GLASS BLOCKS



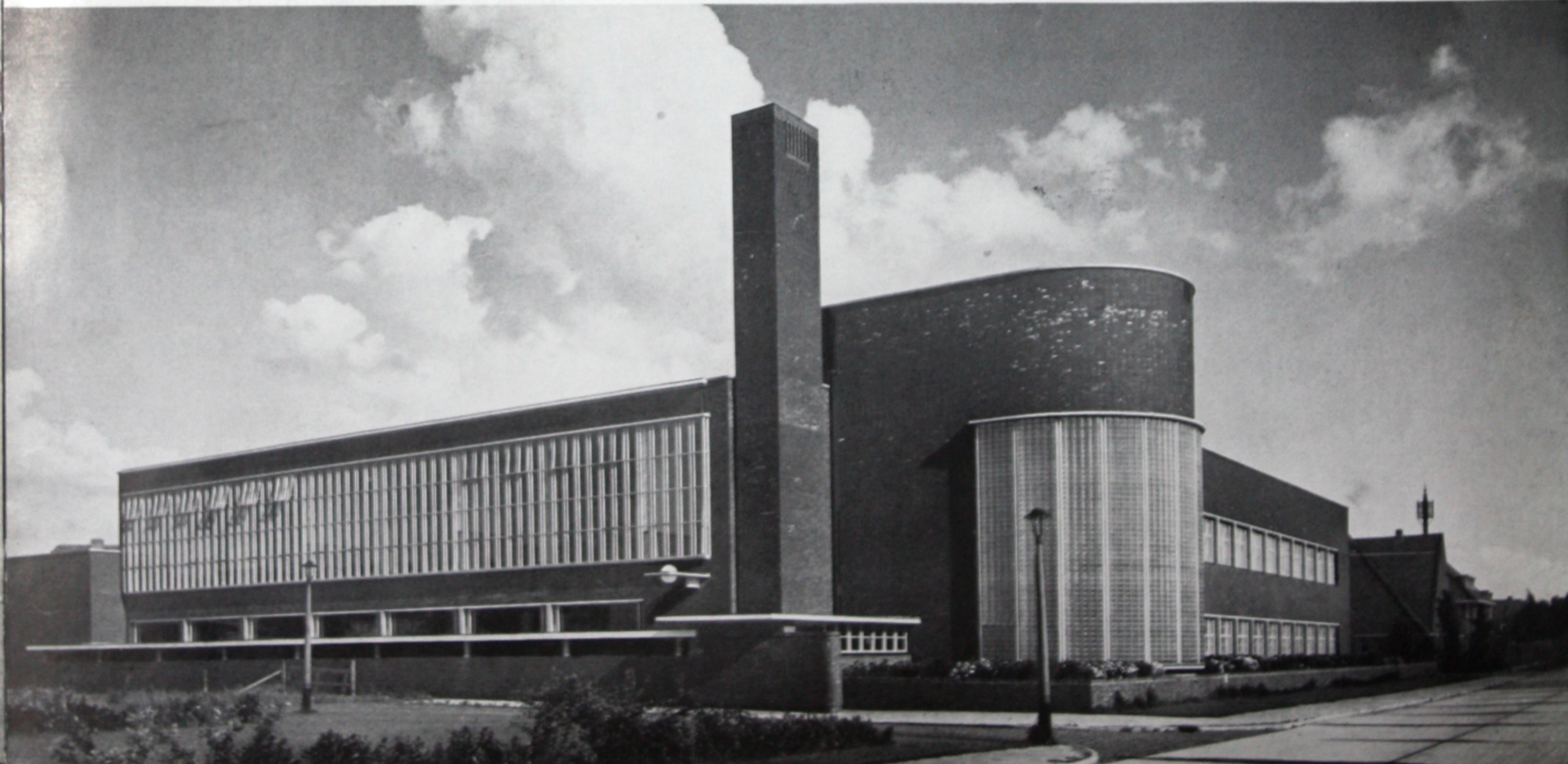


ENGLAND

The restaurant at Whipsnade, shown on the left, is a good example of the combined use of flat glass and glass block, a treatment which here emphasizes the view, and the privacy afforded the diners. Right: an all-glass demonstration room.

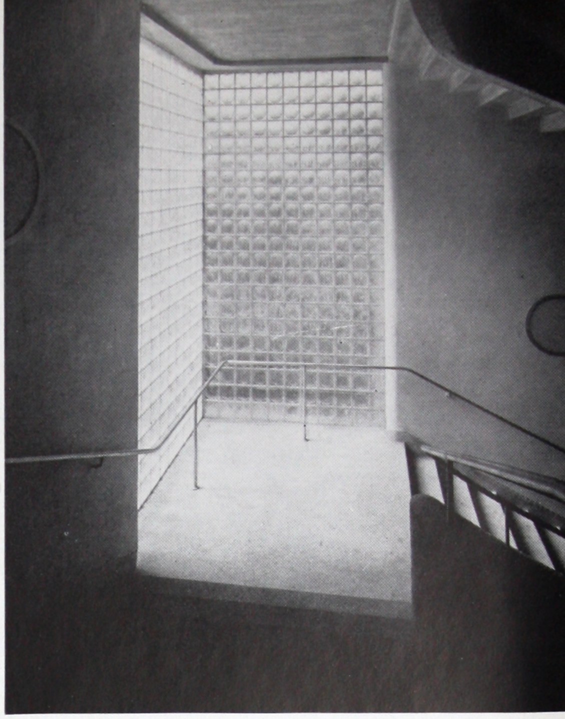
With characteristic sobriety the Dutch prefer to emphasize the strictly architectural uses of glass block. A typically excellent example is this large school at Hilversum.

HOLLAND



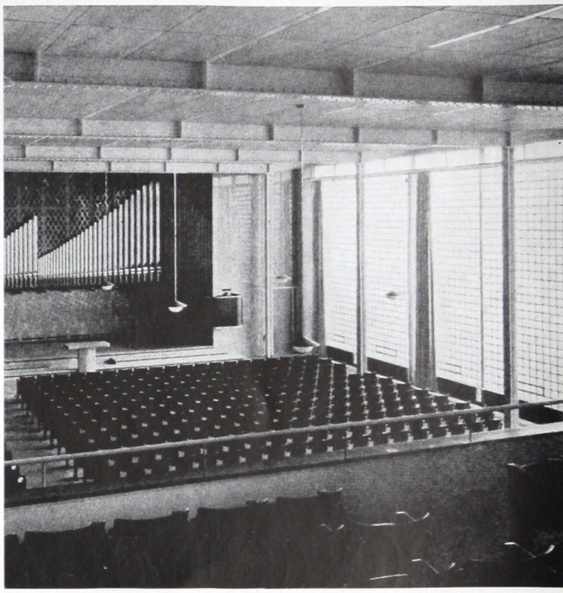
This school in Vienna is typical of the many which use glass block in a similarly clean-cut fashion, and parallels the developments in recent U.S. school architecture.

AUSTRIA



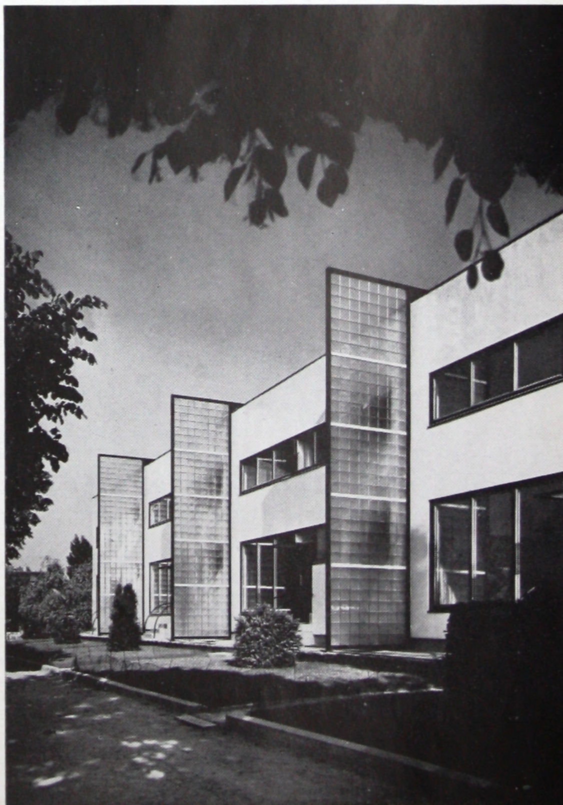
The church in Basel shown here won a competition in which 141 plans were submitted. Its severity of form, in keeping with the traditions of Swiss Protestantism, is relieved by the soft, diffused light from its wall of glass block.

SWITZERLAND



A leader in housing developments during the post-War period, Germany has produced a number of ingenious devices for increasing the amenities. These row houses in a Berlin suburb assure their occupants privacy without loss of light by means of glass and steel fins between dwelling units.

GERMANY



ADVANTAGES OF GLASS BLOCK CONSTRUCTION

Greater heat insulation efficiency than single glazed window light construction.

Sound insulating properties comparable to other forms of masonry construction, and decidedly superior to single glazed window sash.

Considerably less solar heat transmission than with the use of glazed sash.

Translucence without transparency.

Less condensation than usually encountered in sash construction where wide fluctuations of temperature and humidity occur.

High unit strength insuring durability.

Easy to clean.

Low maintenance cost.

High decorative value.

PC GLASS BLOCKS

PC Glass Blocks are made of clear, colorless glass of proven durability.

PC Glass Blocks are "all glass" units with fused seals made at high temperatures, free of entrapped water vapor.

PC Glass Blocks have translucent edges with a grit-bearing plastic coating which forms a permanent bond between glass and mortar. This insures a high degree of wind resistance and weather-tightness.

PC Glass Block edge construction forms a "keylock" mortar joint, providing a full bed of mortar, yet permitting a 1/4" visible joint which is desirable.

MANUFACTURE

Pittsburgh Corning Corporation, a subsidiary formed by the Corning Glass Works and the Pittsburgh Plate Glass Company, unites the research and manufacturing facilities of the world's foremost manufacturer of technical glass and its greatest producer of flat glass products. The new corporation will specialize in the development, manufacture and sale of various forms of structural glass, and a large staff of research experts will focus its attention not only upon improvement of the products themselves, but also upon the dissemination among the building industry of useful and authoritative installation data.

The glass blocks now being offered are made in two halves fused together, resulting in a permanent weather-tight unit having a joint which is as strong as any other part of the block. As fusing is accomplished at a very high temperature, the blocks are partially evacuated and free from entrapped water vapor. The blocks are crystal clear, with their exposed surfaces smooth and easy to clean, all decoration being on the interior surface.

All bonding surfaces are coated with a thoroughly tested water-and alkaline-resistant plastic material. This increases the bond strength between the cement mortar and the glass, and adds greatly to panel strength and permanent water-tightness.

PROPER INSTALLATION

IMPORTANT BASIC FACTS

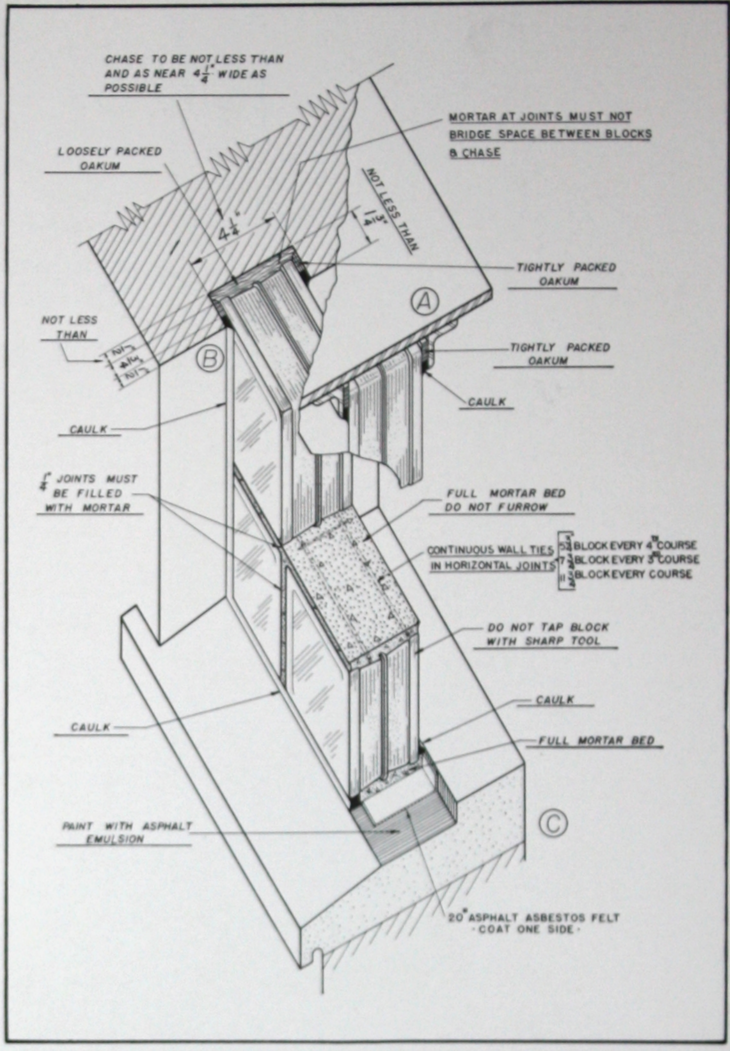
1. PC Glass Block panels are non-load-bearing.
2. Adequate provision must be made for expansion at side jambs and head.
3. Sills must be painted with a heavy coat of asphalt emulsion or asphalt paint before placing felt strip and laying first mortar bed.
4. PC Glass Block panels should not exceed 144 sq. ft. in area or 20 lineal feet in any one dimension without using intermediate expansion joints.

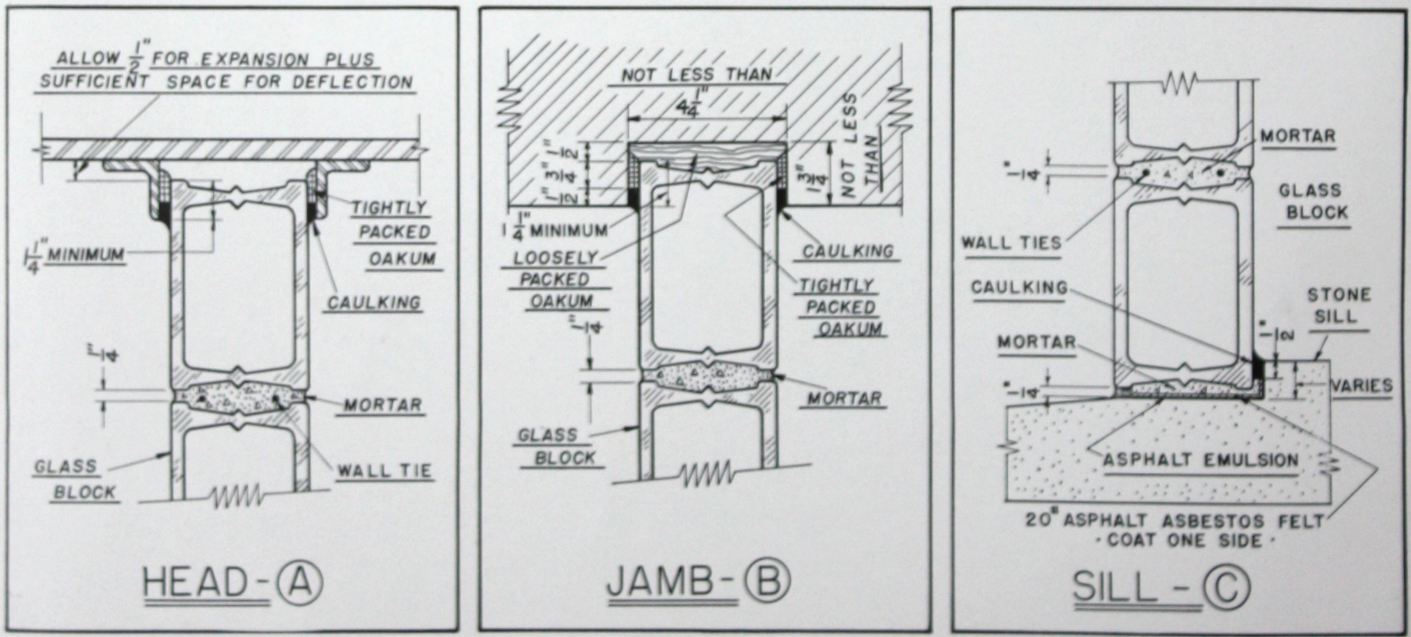
MORTAR MIX

Use one (1) part Portland cement, one (1) part lime, and four (4) to six (6) parts sand measured by dry volume. Mix mortar drier than for clay brick work.

WORKMANSHIP

1. Fill all joints completely with mortar.
2. Do not furrow.
3. Use quarter-inch joints.
4. Strike and tool joints to smooth finish after initial set.
5. Do not tap PC Blocks with metal or sharp tool.
6. Clean excess mortar from faces of PC Blocks before it has set.
7. Consult drawings shown for basic laying procedure.

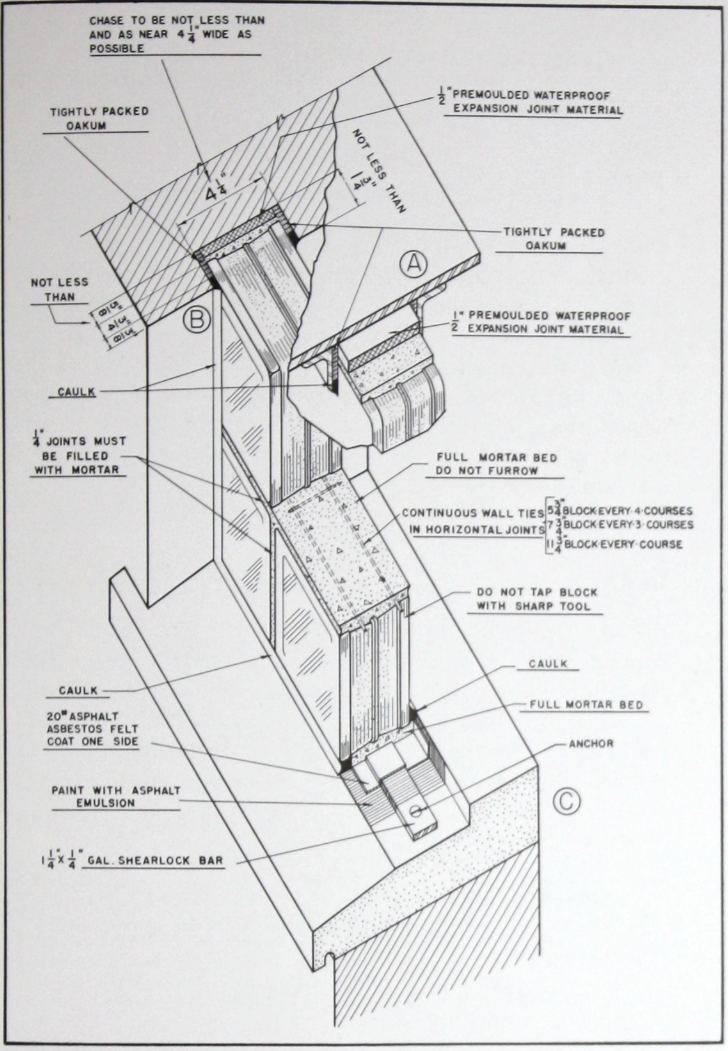

CHASE TO BE NOT LESS THAN AND AS NEAR 4 1/4" WIDE AS POSSIBLE
MORTAR AT JOINTS MUST NOT BRIDGE SPACE BETWEEN BLOCKS & CHASE
LOOSELY PACKED OAKUM
NOT LESS THAN
4 1/4"
1 3/4"
TIGHTLY PACKED OAKUM
A
NOT LESS THAN
1/2
4 3/4
1/2
B
TIGHTLY PACKED OAKUM
CAULK
CAULK
1/4" JOINTS MUST BE FILLED WITH MORTAR
FULL MORTAR BED DO NOT FURROW
CONTINUOUS WALL TIES IN HORIZONTAL JOINTS
5 3/4 BLOCK EVERY 4th COURSE
7 3/4 BLOCK EVERY 3rd COURSE
11 3/4 BLOCK EVERY COURSE
DO NOT TAP BLOCK WITH SHARP TOOL
CAULK
CAULK
FULL MORTAR BED
PAINT WITH ASPHALT EMULSION
C
20# ASPHALT ASBESTOS FELT ·COAT ONE SIDE·



TYPICAL DETAILS SHOWING USE OF FIBROUS EXPANSION JOINT MATERIAL

PITTSBURGH CORNING PC GLASS BLOCKS

OF PC GLASS BLOCKS

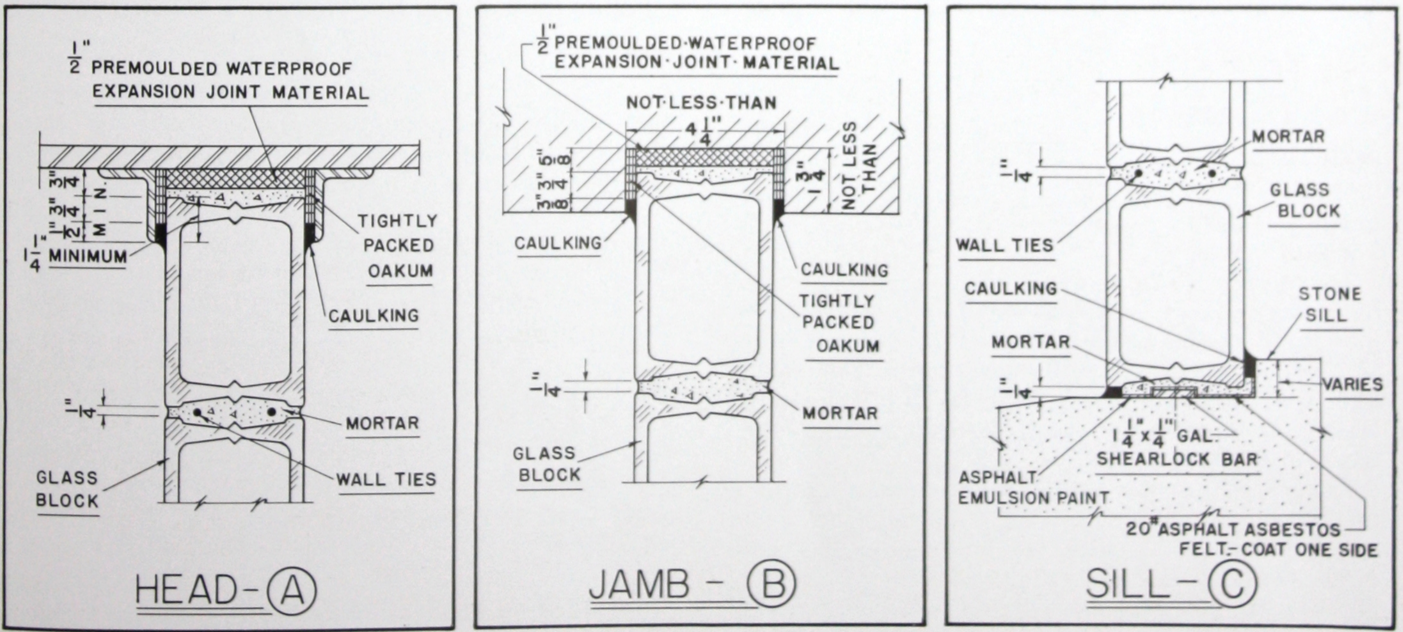

CHASE TO BE NOT LESS THAN AND AS NEAR 4 1/4" WIDE AS POSSIBLE
TIGHTLY PACKED OAKUM
1/2" PREMOULDED WATERPROOF EXPANSION JOINT MATERIAL
4 1/4"
NOT LESS THAN 1 3/4"
TIGHTLY PACKED OAKUM
Ⓐ
NOT LESS THAN
5/8"
3/4"
3/8"
Ⓑ
1/2" PREMOULDED WATERPROOF EXPANSION JOINT MATERIAL
CAULK
1/4" JOINTS MUST BE FILLED WITH MORTAR
FULL MORTAR BED DO NOT FURROW
CONTINUOUS WALL TIES IN HORIZONTAL JOINTS
5 3/4" BLOCK EVERY 4 COURSES
7 3/4" BLOCK EVERY 3 COURSES
11 3/4" BLOCK EVERY COURSE
DO NOT TAP BLOCK WITH SHARP TOOL
CAULK
CAULK
FULL MORTAR BED
20# ASPHALT ASBESTOS FELT COAT ONE SIDE
ANCHOR
PAINT WITH ASPHALT EMULSION
Ⓒ
1 1/4" x 1/4" GAL. SHEARLOCK BAR

IMPORTANT BASIC REASONS FOR USE OF PREMOULDED FILLER MATERIALS

1. Sound and permanent type of construction.
2. Elimination of void spaces. This provides greater resistance to penetration of water and air and results in improved insulation.
3. Prevention of mortar bridging space between the glass blocks and the adjacent construction.
4. Provision of a clean and quick method for preparing the openings to receive the glass blocks.
5. Lower cost of installation.
6. Ease of erection.
7. Availability in unit lengths of 3′-0″.

CONSTRUCTION DETAILS

Additional typical construction details, giving installation data for numerous other applications of glass blocks, will be available to architects and contractors as they are prepared.



HEAD-Ⓐ JAMB-Ⓑ SILL-Ⓒ

TYPICAL DETAILS SHOWING USE OF PREMOULDED EXPANSION JOINT MATERIAL

APPLICATION

HEADS AND JAMBS

Provision for relative movements of the panel and the adjacent construction shall be in the form of approved pre-moulded water-proof expansion joint strips or water-proofed fibrous packings. A space at least ½″ in depth shall be provided for expansion joint materials. In the case of interior partitions it is permissible to use mastics, soft fibrous packings, or heavy roofing felt, in such places as around door bucks and window frames. At least ¼″ space must be provided at partition heads to allow for possible deflection of ceilings, etc.

For most satisfactory results glass block panels should be built in openings which have been provided with chases of the proper width and depth. Where panels are installed with wall anchors, these shall be so designed and placed as not to interfere with the free motion of the panel in the wall opening.

SILLS

Sills shall be of approved "slip construction" permitting greatest possible freedom of relative movement between the panel and the supporting structure. In no case shall "full chase" or channel sills be used.

WALL TIES

In exterior panels wall ties shall be used in horizontal mortar joints as follows:

5¾″ x 5¾″ size—every four courses.
7¾″ x 7¾″ size—every three courses.
11¾″ x 11¾″ size—every course.

Wall ties shall run continuously with ends lapped at least 6″, and shall not be anchored to the surrounding construction.

Wall ties shall be galvanized, and may be of the expanded metal type, perforated metal strips, or a double wire mesh formed of two parallel wires (.150″ thick) with electrically welded cross wires at regular intervals.

SIZE

Panels shall be built in units not exceeding 144 square feet of exposed surface area, and shall have no dimension greater than 20 feet without provision for intermediate supports. All division supports shall provide for expansion and anchorage of panels in accordance with above specifications.

INSTRUCTIONS FOR SETTING

WORKMANSHIP

PC Blocks are designed to be laid up in square bond and with ¼″ visible mortar joints. So laid the average spacing center to center of the joints will be 6-inch, 8-inch or 12-inch.

For satisfactory appearance and performance careful workmanship is essential. All joints must be completely filled with mortar. ***Mortar joint beds must not be furrowed.*** To assist the mason in determining that joints are well packed the edges of PC Blocks are translucent—permitting visual inspection after each block is placed in position.

PC Blocks may be laid up in separate lifts of a limited number of courses each in order to avoid compaction. Where such interruptions in the work occur, the exposed horizontal and vertical edges of the blocks must not be covered with mortar until laying is resumed.

It is desirable that exposed mortar joints be kept wet for at least twenty-four hours after placing. Wet burlap hung over the panels will provide for this.

While mortar is still plastic and before the end of each day's work all excess mortar shall be cleaned off the faces of the blocks and the joints raked out to a depth necessary to expose the corners of the blocks as sharp clean lines, and the joints immediately tooled slightly concave and smooth.

All edges, both inside and outside, of glass block panels shall have provision for a caulking recess. This recess shall have a depth at least equal to its width and shall be filled with an approved mastic caulking compound after all mortar and other foreign material have been cleaned out.

MORTAR

Mix

The proper mortar for glass block construction consists of one part Portland Cement, one part lime, and from four to six parts sand, measured by dry rodded volumes. The mortar must be well mixed with only enough water to produce a workable or fatty mix. Consistency should be as stiff as will permit good working, because glass blocks are non-absorbent. Approximately ten gallons of water per bag of cement has been found to give best results under average conditions.

Mortar should be mixed in quantities not larger than can be used in thirty minutes.

Re-tempered or re-mixed mortar should not be used.

Mortar that has been placed but not covered with blocks for more than thirty minutes must be removed and replaced.

Setting accelerators should not be used, and freezing must be prevented without the use of anti-freeze compounds.

Cement

Use a standard brand conforming with the specifications of the American Society for Testing Materials, A.S.T.M. Designation C9-30.

Lime

Lime should be an approved brand, high calcium, well slaked Quick Lime, Hydrated Lime, or Mason's Hydrate. These materials shall conform respectively with the A.S.T.M. specifications C5-26 and C6-31.

Sand

The sand used shall be free from silt, clay and loam in excess of 3% by weight as determined by decantation. Not more than 5% by weight shall pass a No. 100 mesh sieve and 100% shall pass thru a No. 8 mesh sieve.

TECHNICAL DATA

CRUSHING STRENGTH

Glass block construction should never be used for load-bearing walls or panels. However, it is necessary that the individual blocks have ample strength to resist the forces which are created by conditions within the masonry construction itself.

Repeated tests on individual PC Blocks have established their strength as from 800 to 1400 lbs. per sq. inch of gross loaded area—when the blocks are tested on edge. Similarly made tests on 32-inch square wallettes laid up with 8-inch PC Blocks show a panel compressive strength in excess of 300 lbs. per sq. inch of gross loaded area.

BOND STRENGTHS

PC Blocks have a special grit-bearing, moisture-and alkaline-resisting, translucent coating on all mortar edges. This insures a complete and permanent bond between the glass and the cement mortar and provides a panel construction having a high degree of wind resistance and water-tightness. Tests have established the following values for bond strengths:

Shear-bond	150 lbs. per sq. in. (28 days)
Tension-bond	35 lbs. per sq. in. (28 days)
Modulus of rupture-bond	100 lbs. per sq. in. (28 days)

WIND RESISTANCE

Tests have demonstrated that panels as large as 100 sq. ft. in area will carry a load of 80 lbs. per sq. ft. distributed uniformly over the surface. This is equivalent to a wind velocity of about 160 m.p.h.

SURFACE CONDENSATION

Tests show that condensation of moisture on the warm side of PC Glass Block panels will not occur even under these extreme conditions:

	Test 1	Test 2
Inside relative humidity (max.)	40%	65%
Inside air termperature	70°F	70°F
Outside air temperature (still air)	−30°F	0°F

It will be seen from these figures that glass block construction is suitable where wide fluctuations of temperature and humidity occur, and in buildings where manufacturing processes cause or require a high and constant humidity.

THERMAL INSULATION

One of the advantages of glass block construction over single glazed window light construction is its greater heat insulation efficiency, due largely to the dead air space within the blocks. Tests on PC wall panels laid up in typical manner gave the following Overall Coefficient of Heat Transfer:

(a) for still air: U = 0.48 B.T.U.s per sq. ft. per hour per degree F.
(b) for moving air: U = 0.55
(15 m.p.h. wind)—when compared to a figure of 1.1 for single glazed window sash PC Blocks have double the insulating value.

The above values apply to all PC Blocks, regardless of sizes, shapes and patterns.

SOUND INSULATION

Glass block panels have better sound insulating properties than other forms of masonry construction having equal weight per unit surface area and are decidedly superior to single glazed sash. They will improve the acoustics of rooms in which they are used to replace the latter. Tests give sound reduction factors for glass block panels from 37.6 to 42.0 decibels.

LIGHT TRANSMISSION

Tests on individual PC Blocks have been made in a sphere-photometer to determine the over-all transmission of light through the block faces. This test most closely approximates service conditions and for the two standard patterns gives an average value of 74%. This figure means that the individual blocks will transmit this percentage of the light falling on them.

When laid up according to standard practice PC Block panels will transmit between 50% and 55% of the total light incident on them.

By the use of refracting and reflecting patterns on the blocks it is possible to decrease the light transmission through individual blocks to approximately 25%. By other changes in the patterns it is possible to increase or decrease the degree of light diffusion within wide limits. Special patterns to produce these results are being studied.

SOLAR HEAT TRANSMISSION

Glass Block panels will transmit from 50 to 60 per cent of solar heat energy, depending upon joint widths, glass composition and face cuttings as compared with the approximately 80 per cent transmitted by single glazed sash.

WATER-TIGHTNESS

Tests in which large panels of PC Blocks have been subjected to a wind driven (15 m.p.h.) water spray for eight hours, followed by 16 hours of spray without wind, showed that the panels were capable of withstanding severe conditions of storm exposure without penetration. It should be emphasized, however, that water-tightness in any masonry construction is dependent upon proper workmanship in the jointing. For this reason PC Blocks have a translucent edge coating which allows careful inspection of the joints in the finished wall.

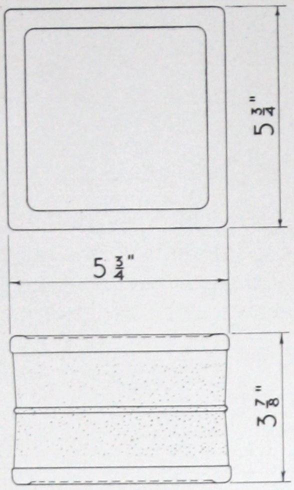
WEATHERING RESISTANCE

For more than a year many full scale panels of PC Glass Block construction have been subjected to accelerated weathering tests to determine the effects of extreme cold, heat, wetness, and dryness. Temperatures well above and below those encountered in any type of service have been used. These temperatures have been applied to panels in a completely dry state as well as to those which have been thoroughly soaked with a wind driven water spray. All of this work shows conclusively that PC Glass Block panels built according to our recommendations are extremely rugged and will withstand all possible combinations of weathering attacks.

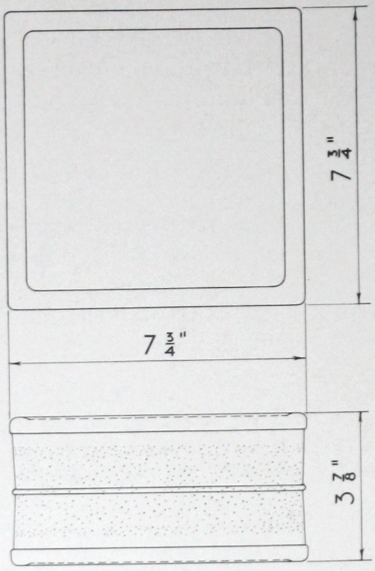
ESTIMATING DATA (for 100 sq. ft. of Panel Area)

Size of Block	5¾″	7¾″	11¾″
Number of Blocks	400	225	100
Shipping weight of Blocks	1316 lbs.	1336 lbs.	1600 lbs.
Volume of mortar joints	2.6 cu. ft.	2.0 cu. ft.	1.4 cu. ft.
Crew Hours (one mason two helpers)	10	8	6
Approximate weight in panel	1800 lbs.	1600 lbs.	1800 lbs.

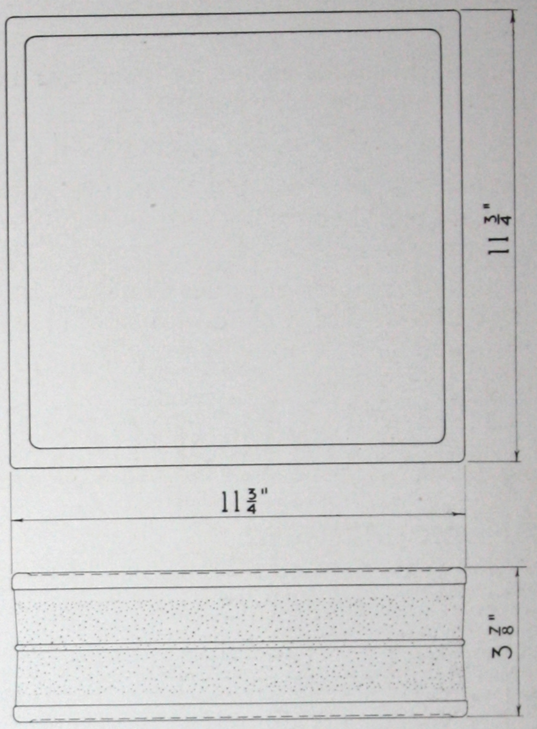
STANDARD TYPES—SIZES—PATTERNS



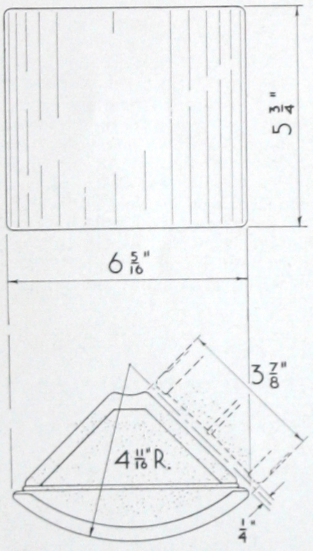
5¾" STANDARD



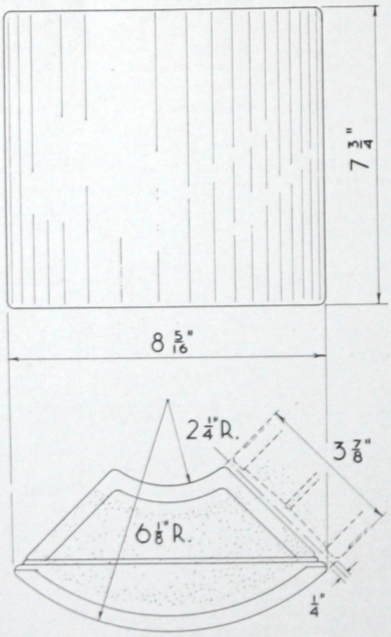
7¾" STANDARD



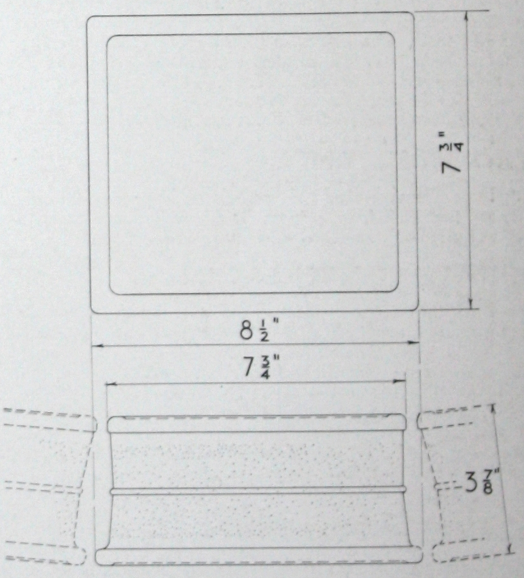
11¾" STANDARD



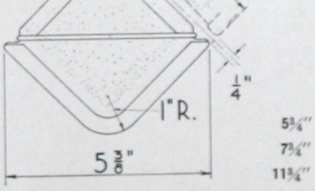
5¾" CORNER BLOCK



7¾" CORNER BLOCK



7¾" RADIAL BLOCK



BULLNOSE BLOCK
HEIGHT 7¾"

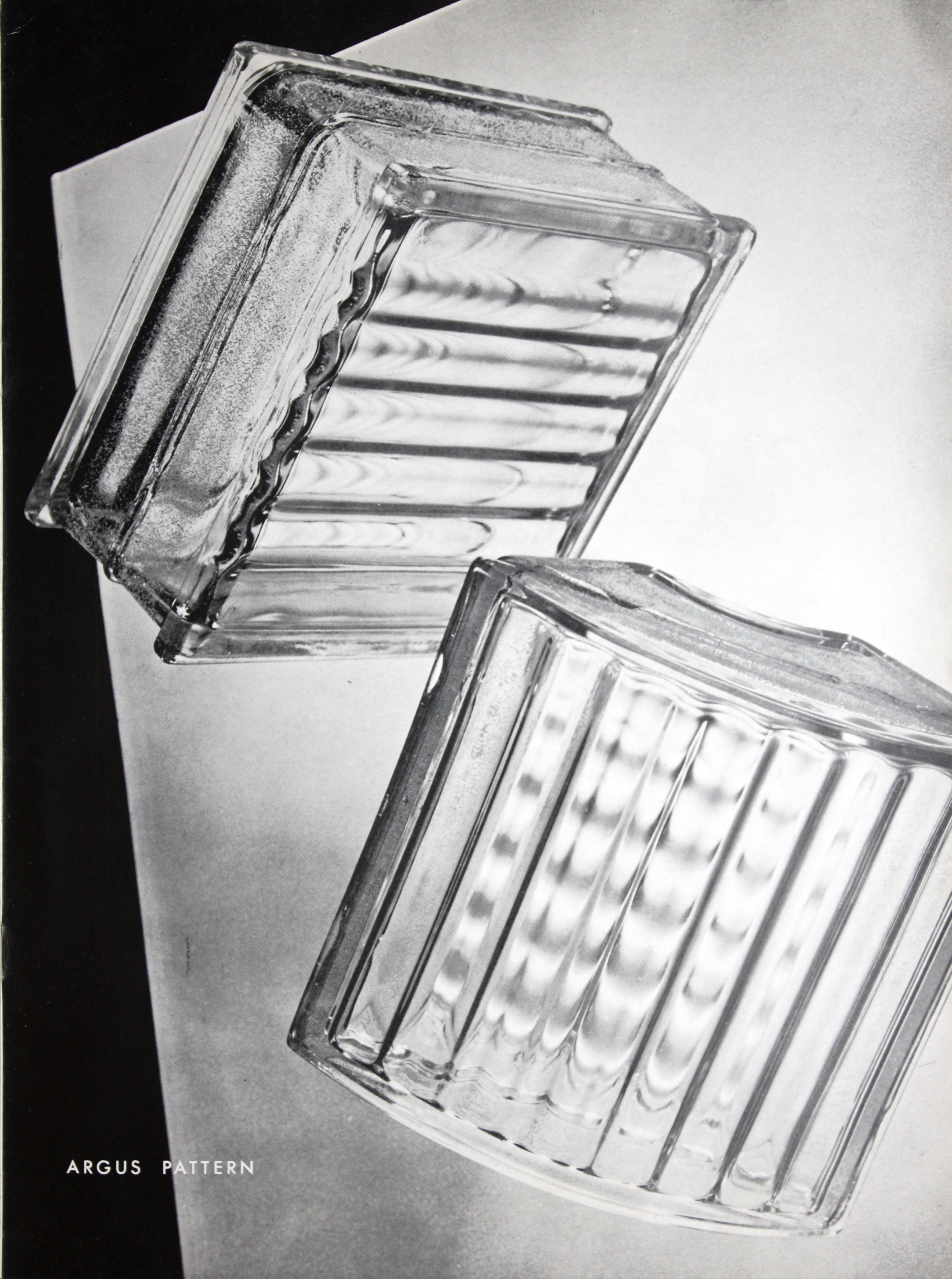
P C GLASS BLOCKS—AVAILABLE PATTERNS

5¾"	Standard Block	ARGUS and DECORA
7¾"	Standard Block	ARGUS and DECORA
11¾"	Standard Block	ARGUS only
5¾"	Corner Block	ARGUS and DECOR A
7¾"	Corner Block	ARGUS and DECOR A
7¾"	Radial Block	ARGUS and DECOR A
7¾"	Bull Nose Block	ARGUS and DECOR A

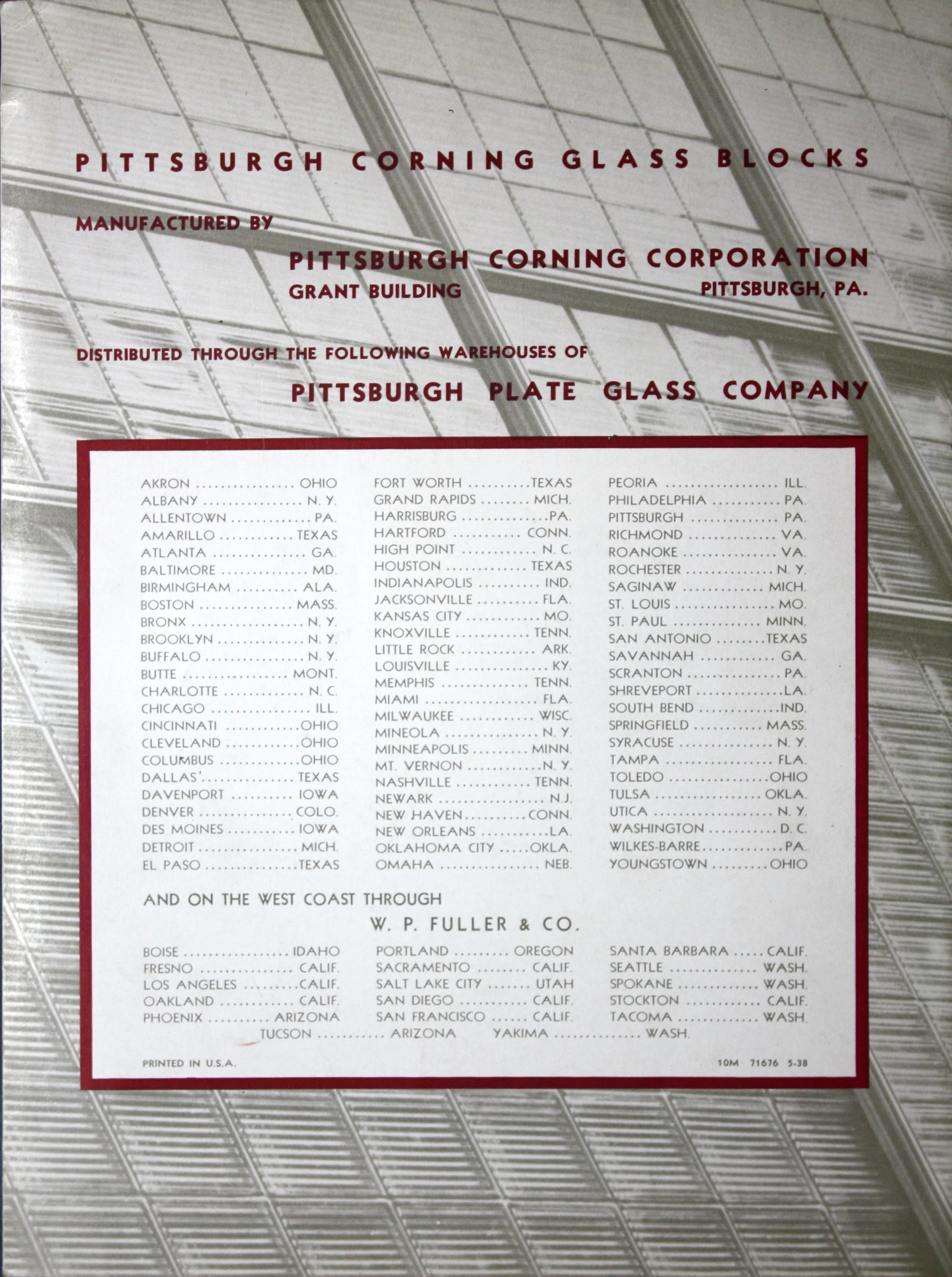
TABLE SHOWING LIMITATIONS FOR USE ON CURVES

PC Block	Minimum Radii to Outside Face	Joint Thickness
7¾" Radial	2'-5"	Radii given are based on recommended joint thickness of not less than ⅛" on inside face and not more than ⅝" on outside face.
5¾" Standard	4'-4"	
7¾" Standard	5'-9"	
11¾" Standard	8'-6"	

The 7¾" Radial Blocks may be used up to a maximum radius of 6'-6". Above this point the 7¾" Standard Block can be used.



ARGUS PATTERN



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